S. A. MILES.

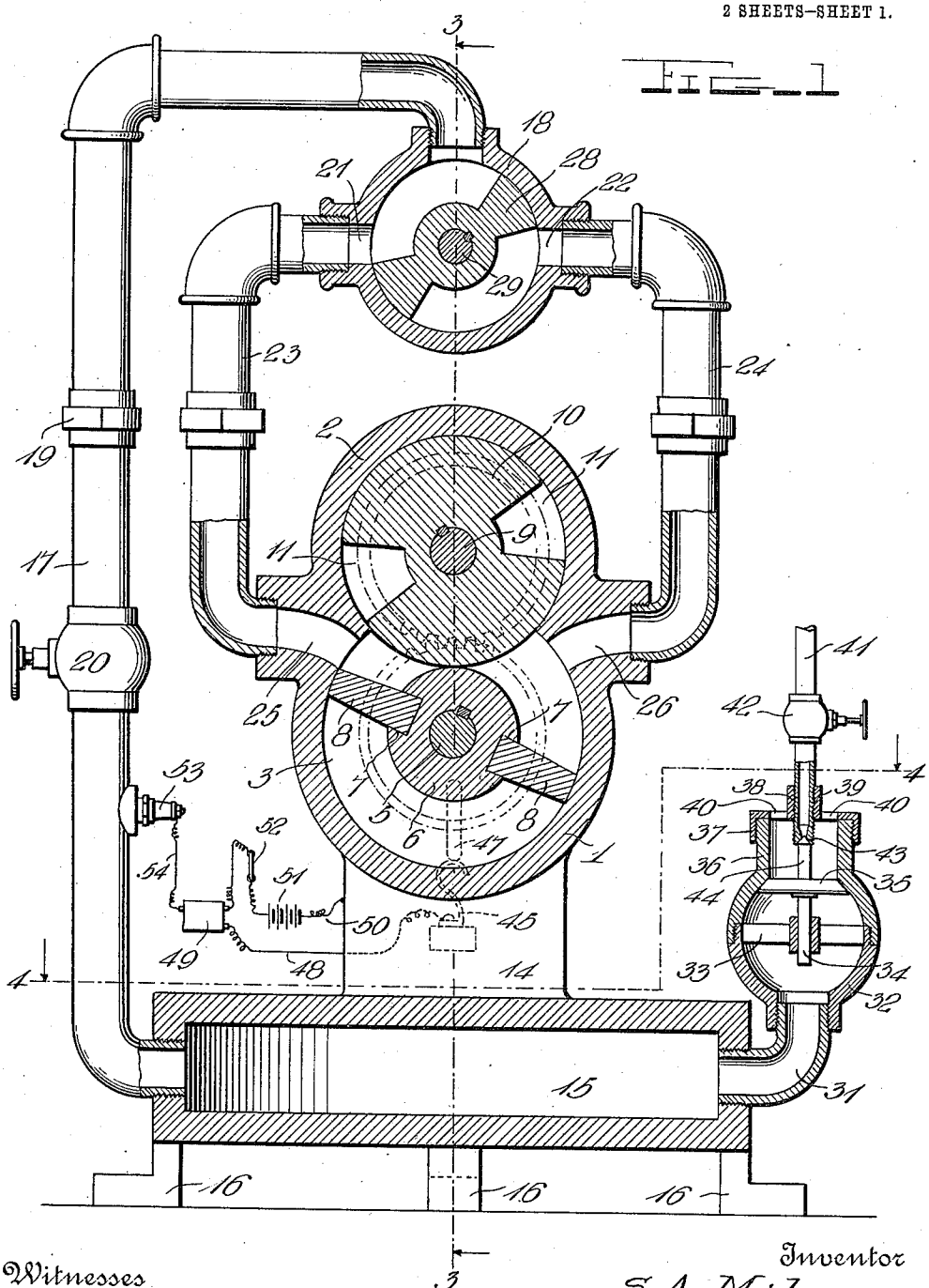
ENGINE.

APPLICATION FILED MAY 18, 1911.

1,023,670.

Patented Apr. 16, 1912.

2 SHEETS—SHEET 1.



Witnesses

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2 SHEETS—SHEET 2.

FIG. 2

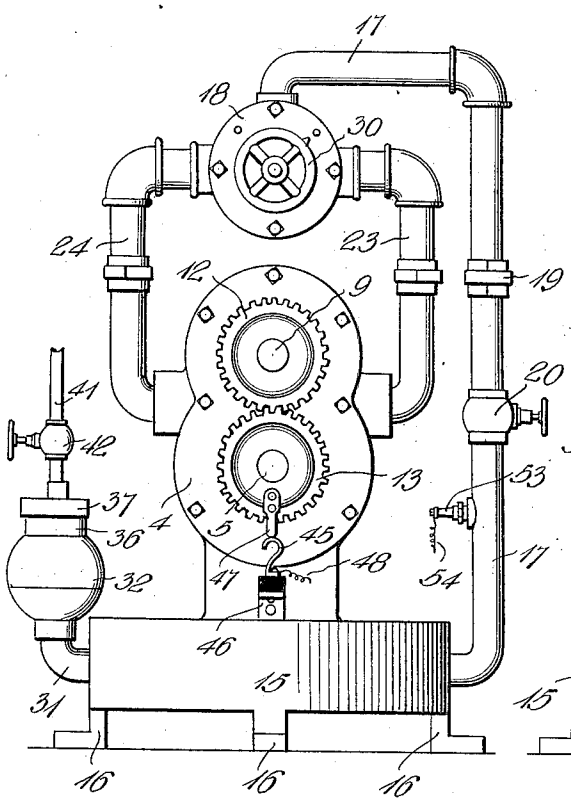


FIG. 3

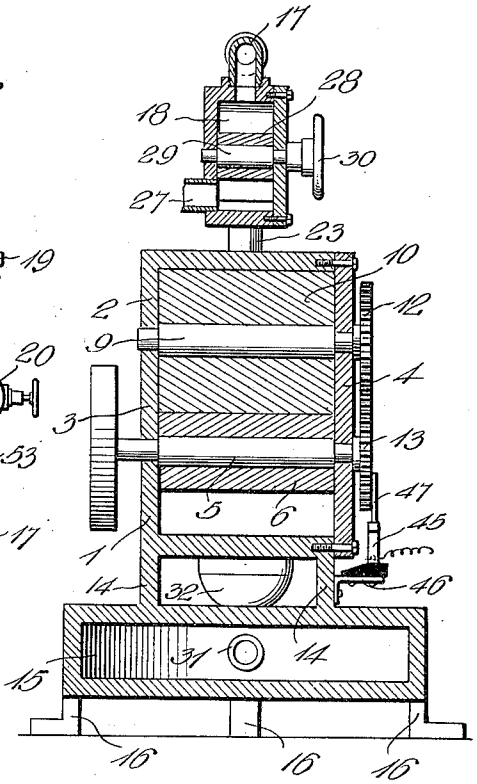
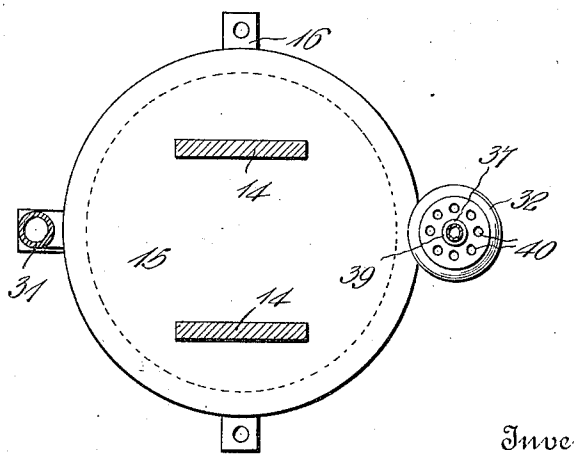


FIG. 4



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UNITED STATES PATENT OFFICE.

SAMUEL A. MILES, OF PHILADELPHIA, PENNSYLVANIA.

ENGINE.

1,023,670. Specification of Letters Patent. Patented Apr. 16, 1912.

Application filed May 18, 1911. Serial No. 628,063.

To all whom it may concern:

Be it known that I, SAMUEL A. MILES, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in engines.

One object of the invention is to provide a rotary engine which may be driven by any suitable fluid and which is provided with an improved construction of automatically operated fluid supply valve whereby fresh charges of fluid are supplied to the engine at the proper time.

Another object is to provide an improved construction and arrangement of valves whereby the admission of the fluid to the cylinder and piston of the engine is controlled and whereby the engine may be reversed.

With these and other objects in view the invention consists of certain novel features of construction, and the combination and arrangement of parts as will be more fully described and claimed.

In the accompanying drawings: Figure 1 is a central vertical section of my improved engine; Fig. 2 is a side view of the same; Fig. 3 is a vertical section taken at right angles to and on the line 3—3 of Fig. 1; Fig. 4 is a horizontal section on the line 4—4 of Fig. 1.

My improved engine comprises a casing consisting of a lower cylindrical body 1 and an upper cylinder 2. The lower cylinder 1 forms the piston chamber of the engine while the upper cylinder forms an abutment chamber. The cylinders or chambers 1 and 2 are closed at one end by an integral head 3 and at their opposite ends by a removable head 4. The chambers formed by the cylinders 1 and 2 communicate with each other as clearly shown in Fig. 1 of the drawings. In the center of the chamber 1 and revolubly mounted in the heads 3 and 4 is a main or power shaft 5 on which is fixedly mounted the concentric rotary piston 6 of the engine. In the opposite sides of the piston 6 are formed longitudinally disposed dovetail shaped grooves 7 in which are secured the inner edges of the radially projecting wings or blades 8 of the piston.

Arranged through the center of the chamber formed by the cylinder 2 and having its ends revolubly mounted in the heads of the cylinders is an abutment supporting shaft 9 on which is fixedly mounted a rotary cylindrical abutment 10 the outer surface of which closely engages the inner wall of the cylinder 2. The lower portion of the rotary abutment 10 projects through the opening between the cylinders 1 and 2 and forms a fluid tight engagement with the adjacent portion of the piston thereby forming a closure or abutment between which and one or the other of the wings or blades 10 the driving fluid is adapted to expand and thus drive the piston.

Formed at diametrically opposite points in the rotary abutment 10 are blade receiving recesses 11 with which the blades or wings 8 of the piston are successively engaged to permit said wings or blades to pass the rotary abutment as the piston revolves. On one end of the shaft 9 of the rotary abutment 10 is fixedly mounted a spur gear 12 which is in operative engagement with a similar gear 13 fixed on the adjacent end of the shaft 5 of the piston whereby the rotary abutment is driven by the piston. The relative arrangement or position of the recesses 11 in the abutment with respect to the position and arrangement of the wings or blades 8 is such that the recesses 11 will be successively brought into position to receive the projecting portions of the wings or blades as they are brought around by the revolving piston.

The cylinders 1 and 2 have formed on their lower ends parallel supporting standards 14 which are connected to and preferably formed integral with a hollow supporting base 15 which is preferably of cylindrical form and is provided on its lower side with right angular supporting lugs or feet 16 whereby the engine is supported and may be firmly secured to a floor or stationary base. The hollow base 15 forms a combustion or explosion chamber and to one side thereof is connected a combined fuel conducting pipe and explosion chamber 17 the upper end of which is connected with a cylindrical valve chamber 18 as shown. The pipe and explosion chamber 17 is preferably formed in sections which are connected by a suitable union 19 and in said pipe and

chamber is arranged a controlling valve 20 by means of which the passage of the exploded charge of fuel through the pipe 17 to the valve casing 18 may be controlled.

In the opposite sides of the valve casing 18 are formed discharge ports 21 and 22, said ports being respectively connected by fuel conducting pipes 23 and 24 to fuel inlet ports 25 and 26 arranged in the opposite side of the cylinder 1 and connected with the piston chamber of the latter. In the valve casing 18 is also formed an exhaust port 27 and in said casing is arranged a rotary reversing valve 28 which is fixed on an operating stem 29. The ends of the stem 29 are revolubly mounted in the opposite heads of the valve casing and fixedly mounted on one end of said stem is a hand wheel 30 by means of which the valve may be turned to connect the inlet port of the casing with which the supply pipe 17 is connected with one or the other of the discharge ports 21 or 22, the opposite port being connected by the valve with the exhaust port 27 in said casing. By thus arranging the fuel conducting pipes and the valve 28 it will be seen that the course of the exploded fuel may be readily controlled and quickly directed to either of the discharge ports of the valve casing thus providing for the quick reversal of the engine. By this arrangement it will be seen that the fuel conducting pipes will act both as supply and exhaust pipes according to the position of the reversing valve and the direction in which the engine is to be operated.

Connected with the opposite side of the hollow base 15 from that to which the combined fuel pipe and explosion chamber is connected is a fuel inlet pipe 31 in which is arranged an automatically operating fuel intake or carbureting valve comprising a substantially spherical casing 32 which is formed in separable hemispherical sections adapted to be screwed together or operatively connected in any suitable manner. In the lower portion of the valve casing is arranged a spider 33 with which is slidably engaged the stem 34 of a valve 35 which is adapted to close and open the upper end of the casing 32. On the upper end of the casing 32 is formed a neck 36 with which is engaged a cap 37 in which is formed a centrally disposed opening 38 and on which around said opening is formed an upwardly projecting interiorly threaded boss 39. In the cap 37 around the boss 39 is also formed an annular series of air inlet passages 40 through which air is drawn into the valve casing 32.

Connected with the boss 39 and extending through the opening 38 in the cap 37 is a fuel supply pipe 41 having arranged therein a cut off valve 42. The inner end of the pipe 41 projects a suitable distance into the neck 36 of the valve casing and has formed in its inner end a conical valve seat 43 with which is adapted to be engaged the conical shaped end of an upwardly projecting extension 44 of the valve stem 34, said conical end of the valve stem extension forming a supplemental valve for automatically closing the inner end of the fuel supply pipe when the main valve 35 is in a closed position. By arranging the main and supplemental valves as herein shown and described it will be seen that when an explosion occurs in the pipe 17 and hollow base 15 that the pressure resulting from said explosion will automatically close said valves thus cutting off a further supply of fuel until the pressure of the valves has been relieved by the passage of the exploded fuel to the engine whereupon the valves will drop by gravity or be forced down by the pressure of the air and fuel on the same thus admitting a fresh charge or supply of fuel to the hollow base 15 and pipe 17.

The sparking or igniting mechanism of the engine comprises a stationary contact spring 45 which is secured to and insulated from a suitable supporting bracket 46 arranged on one of the supporting standards 14 in position to be engaged by a wiper 47 forming the other contact terminal and which is carried by the gear 13 on the shaft of the piston whereby said wiper is brought into engagement with the spring contact terminal 45 at each complete revolution of the piston. The wiper 47 is secured to the gear in position to engage the terminal 45 and complete the electric circuit of the sparking mechanism to ignite the fuel at the proper time. To the spring contact terminal 45 is connected one end of one of the current conducting wires 48 of the sparking circuit while the opposite end of said wire 48 is connected with an induction coil 49. The other wire 50 of the circuit is connected at one end of the casing of the engine and at its opposite end to the coil 49. In the wire 50 is arranged a battery 51 and a switch 52. Arranged at a suitable point in the combined fuel conducting pipe and explosion chamber 17 is a sparking plug 53 which is connected by a high tension wire 54 to the coil 49 whereby when the primary circuit is completed through the engagement of the contact terminals 45 and 47 the induced circuit through the high tension wire 54 and the casing and other parts of the engine will also be completed and a spark caused to pass from the plug to the adjacent side of the pipe 17, thus igniting the fuel therein and in the hollow base of the engine. By arranging the controlling valve 20 in the pipe 17 more or less fluid may be admitted to the piston cylinder of the engine and the latter thus controlled as hereinbefore described. The passage of the fluid to the cylinder may also be regulated by adjusting the reversing

valve 28 to partly cover the ports in the reversing valve casing as will be readily understood.

While I have herein shown and described the engine as an explosive chamber it is obvious that the engine may be operated by steam, compressed air or other fluid and said base employed as a storage chamber for the operating fluid. When the engine is operated by the explosion of gas in the base and combined fuel conducting pipe and explosion chamber 17 each explosion will produce sufficient power or pressure to cause the piston to make a number of revolutions and if desired the engine may be stopped before this pressure from the explosion has spent itself by closing the valve 20 in the pipe 17 thus retaining or storing a sufficient pressure in the hollow base to start the engine when the valve 20 is again opened. The pressure thus retained in the base will be sufficient to hold the intake valve closed against atmospheric pressure or the pressure of the fuel in the supply pipe. By thus providing for the retention of a part of the pressure of the last explosion the engine may be quickly started at any time.

It will also be obvious that while I have described the invention as an engine for generating power that if power is transmitted to the device by a separate engine or motor said device may be employed as a rotary pump or blower.

From the foregoing description taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention claimed.

I claim as my invention:—

1. In an engine of the class described, a hollow base, a casing arranged on said base, said casing having formed therein a rotary piston cylinder and a rotary abutment cylinder, a rotary piston operatively mounted in said piston cylinder, a rotary abutment operatively mounted in said abutment cylinder, radially disposed blades arranged on said piston, means whereby said blades are adapted to pass said abutment, a reversing valve, fluid conducting pipes adapted to connect the casing of said valve with said piston cylinder, a fluid conducting pipe to connect said hollow base with said reversing valve casing, a controlling valve arranged in said pipe, and an automatically operating intake valve connected with said base.

2. In an explosive engine, a hollow base, a casing arranged on said base, said casing comprising a piston cylinder and an abutment cylinder, a rotary piston operatively mounted in said piston cylinder, radially projecting blades arranged on said piston, a rotary abutment arranged in said abutment cylinder, said abutment having formed therein radially disposed recesses adapted to receive the blades of said piston whereby the latter are permitted to pass said abutment, means whereby said abutment is geared to and operated by said piston, a reversing valve casing, fluid connecting pipes to connect the opposite sides of said casing with the opposite sides of the piston cylinder, an exhaust port formed in said casing, a combined fuel conducting pipe and explosion chamber to connect said hollow base with said reversing valve casing, a valve arranged in said casing and adapted to connect said combined fuel conducting pipe and explosion chamber with either of said fuel conducting pipes whereby the engine may be run in either direction, a controlling valve arranged in said combined fuel conducting pipe and explosion chamber, and an automatically operating intake valve connected with said hollow base.

3. An engine of the character described, comprising a hollow base forming a combustion chamber, a casing mounted upon said base, said casing having formed therein a rotary piston and abutment cylinder, a rotary piston rotatably mounted in said piston cylinder, a rotary abutment mounted in said abutment cylinder, radially arranged blades projecting from said piston and adapted to enter recesses in the abutment, fluid conducting pipes leading from the opposite sides of the piston cylinder, a reversing valve connected to said pipes and supported thereby, a fluid pipe connecting said hollow base with the top of the reversing valve, a contracting valve located in the said pipe, a carbureting valve also connected to the base, a sparking device for causing an explosion, and means for causing the piston and abutment cylinder to rotate simultaneously.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

SAMUEL A. MILES.

Witnesses:
L. O. HILTON,
O. B. HOPKINS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."